

Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently amended) A method for forming a vertical ferrocapacitor comprising:

depositing a ferroelectric material ~~[[over]]~~ on an insulating layer;

a first etching step of etching of the ferroelectric material to form openings in ~~[[it]]~~ the ferroelectric material;

depositing an electrode layer into the openings formed in the ferroelectric ~~layer~~ material;

a second etching step, after depositing the electrode layer, of etching to ~~remove~~ form gaps in the electrode layer and the insulating layer at the bottom of the openings; and

inserting conductive material into the gaps.

2. (Previously presented) A method according to claim 1 in which the first etching step leaves a film of ferroelectric material remaining at the bottom of the openings, and the film of ferroelectric material is removed during the second etching step.

3. (Previously presented) A method according to claim 1 further comprising planarizing to form a flat upper surface on the ferroelectric material and depositing an insulating layer over it, after inserting the conductive material.

4. (Previously presented) A method according to claim 3 in which the conductive material substantially fills the openings at least up to the planarization level.

5. (Withdrawn) A ferroelectric capacitor produced by a method according to claim 1.

6. (Withdrawn) A FeRAM device including a ferrocapacitor produced by a method according to claim 1.

7. (Previously presented) A method for forming a ferrocapacitor including the steps of:

depositing a ferroelectric material over an insulating layer;

a first etching step of etching of the ferroelectric material to form openings in it, depositing an electrode layer into the openings formed in the ferroelectric layer in which the

first etching step leaves a film of ferroelectric material remaining at the bottom of the openings;

a second etching step, after depositing the electrode layer, of etching the insulating layer at the bottom of the openings to form gaps in it and to remove the film of ferroelectric material; and

inserting conductive material into the gaps.

8. (Previously presented) A method according to claim 1 wherein the electrode layer has a thickness in the range of 15nm to 20 nm.

9. (Previously presented) A method according to claim 1 wherein the insulating layer is Al_2O_3 .

10. (Previously presented) A method according to claim 1 wherein the ferroelectric material is PZT.

11. (Previously presented) A method according to claim 1 wherein the electrode layer contains iridium.

12. (Previously presented) A method according to claim 1 wherein the conductive material contains iridium.

13. (Currently amended) A method for forming a ferrocapacitor includes the steps of:

depositing a ferroelectric material over an insulating layer;

a first etching step of etching of the ferroelectric material to form openings in ~~[[it]]~~ the ferroelectric material, but leaving a film of ferroelectric material remaining at the bottom of the openings;

depositing an electrode layer into the openings formed in the ferroelectric ~~layer~~ material;

a second etching step, after depositing the electrode layer, of etching the film of the ferroelectric material and the insulating layer at the bottom of the openings to form gaps ~~in~~ ~~it~~; and

inserting conductive material into the gaps.

14. (New) A method for forming a vertical ferrocapacitor comprising:

depositing a ferroelectric material over an insulating layer;

a first etching step of etching of the ferroelectric material to form openings in the ferroelectric material;

depositing an electrode layer into the openings formed in the ferroelectric material;

a second etching step, after depositing the electrode layer, of etching to form gaps in the electrode layer and the insulating layer at the bottom of the openings;

inserting conductive material into the gaps; and

planarizing to form a flat upper surface on the ferroelectric material and depositing an insulating layer over the upper surface, after inserting the conductive material.

15. (New) A method according to claim 14 in which the conductive material substantially fills the openings at least up to the planarization level.

16. (New) A method for forming a vertical ferrocapacitor comprising:

depositing a ferroelectric material over an insulating layer;

a first etching step of etching of the ferroelectric material to form openings in the ferroelectric material;

depositing an electrode layer into the openings formed in the ferroelectric material, the electrode layer has a thickness in the range of 15nm to 20 nm;

a second etching step, after depositing the electrode layer, of etching to create gaps in the electrode layer and the insulating layer at the bottom of the openings; and

inserting conductive material into the gaps.

17. (New) A method for forming a vertical ferrocapacitor comprising:

depositing a ferroelectric material over an insulating layer, the insulating layer including Al_2O_3 ;

a first etching step of etching of the ferroelectric material to form openings in the ferroelectric material;

depositing an electrode layer into the openings formed in the ferroelectric material;

a second etching step, after depositing the electrode layer, of etching to create gaps in the electrode layer and the insulating layer at the bottom of the openings; and

inserting conductive material into the gaps.

18. (New) A method for forming a vertical ferrocapacitor comprising:

depositing a ferroelectric material over an insulating layer;

a first etching step of etching of the ferroelectric material to form openings in the ferroelectric material

depositing an electrode layer into the openings formed in the ferroelectric material, wherein the electrode layer contains iridium;

a second etching step, after depositing the electrode layer, of etching to create gaps in the electrode layer and the insulating layer at the bottom of the openings; and
inserting conductive material into the gaps.

19. (New) A method for forming a vertical ferrocapacitor comprising:

depositing a ferroelectric material over an insulating layer;

a first etching step of etching of the ferroelectric material to form openings in the ferroelectric material;

depositing an electrode layer into the openings formed in the ferroelectric material;

a second etching step, after depositing the electrode layer, of etching to create gaps in the electrode layer and the insulating layer at the bottom of the openings; and

inserting conductive material into the gaps, wherein the conductive material contains iridium.